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Lisa Brown Jasa
University of Nebraska-Lincoln, ljasa@unlnotes.unl.edu

CROP WATCH

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No. 94-23
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Your soil test report: *How reliable is it and what do the numbers mean?*

Increasingly, Nebraska producers are using soil tests to determine existing soil nutrients before applying additional inputs. Understanding soil test results is important to their proper use. In the following article, Ken Frank, director of the University of Nebraska-Lincoln Soil and Plant Analytical Laboratory, explains the role and credibility of soil testing labs and how to understand test results.

The Nebraska Soil and Plant Analysis Laboratory Act requires that soil and plant analytical laboratories residing in Nebraska be registered with the Nebraska State Department of Agriculture in order to test soils in Nebraska. However, this act does not have jurisdiction over laboratories outside Nebraska that test soil samples from Nebraska. Laboratories registered under this act can modify or use different methods on soils from outside Nebraska.

Under this act, Nebraska laboratories are inspected by representatives from the State Department of Agriculture Laboratory Division. The inspection covers areas such as 1) qualifications of laboratory supervisor and laboratory personnel, 2) laboratory

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Inside

This issue and the next two issues of *CropWatch* will feature notices of winter Extension meetings related to agricultural production and marketing. Make note of the dates and take advantage of these opportunities to learn the latest information.

West Central District reviews the crop season

The 1994 crop year began with warm temperatures and dry conditions in the West Central district, which resulted in early planting of most crops. The continued lack of rainfall, however, meant that many early applied herbicides were not activated, resulting in poor weed control. In some areas seedbed preparation dried out the soil so that crops did not emerge uniformly.

Winter wheat, especially in the southern part of the district was affected by the dry hot weather and lack of timely rain. Continuous wheat or wheat following soybeans in that area resulted in many low yielding fields with low test weights.

The wheat crop benefited from the stored moisture from above average precipitation in 1993 and from late rains, especially in the northern part of the district. Wheat harvest was earlier than normal with a wide area ready for harvest at the same time. For example, the winter wheat variety plots at McCook and Ogallala were harvested on June 27 and June 29, respectively.

High winds caused some green snap of corn. With the early planting and warm but not hot temperatures, the crop was ready

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Soil tests (Continued from page 155)

operating procedures and quality assurance, 3) sample handling, 4) analytical methods 5) analytical standards and other reagents and 6) quality control.

An important area under quality control is an inter-laboratory check sample program. Personnel at the State Department of Agricultural Laboratory send reference soil samples to each laboratory four times a year. The complete analysis results are tabulated by the state laboratory. These check sample results support individual laboratory quality control programs to help insure that all laboratories are following procedures correctly. If a laboratory continues to have problems with a certain analysis procedure, as shown by erroneous values for a specific procedure, State Laboratory personnel provide assistance to correct the error.

Thus from a chemical analysis standpoint, the results for a particular soil test tend to be in good agreement when analyzed by laboratories that are registered with the Nebraska Department of Agriculture.

The chemical analysis values on Nebraska soils sent to laboratories outside the state are probably reliable since most states have similar check programs. Reliable laboratories also have internal quality control checks.

What do the numbers for individual tests mean?

The analysis result for nitrate-nitrogen (NO_3-N) is the only nutrient that is calculated in pounds per acre. In determining the quantitative value of pounds per acre, the assumption is made that all soils weigh 3,600,000 pounds per acre foot.

Results for other nutrients are usually reported in parts per million (ppm) or percent of extractable nutrient by the prescribed procedure. The amount of nutrient extracted by chemical analysis is an **index** and should not be considered as "pounds of nutrient per acre". It is unfortunate that some laboratories outside Nebraska report the index value for nutrients such as phosphorus and potassium as pounds per acre.

Correlation and calibration

A soil test nutrient index value for soil phosphorus of 11 ppm for a specific soil, for example, **has no meaning** unless information is available to evaluate 1) whether a specific crop will attain maximum growth or yield (or both) at the index value (of 11) and 2) how much phosphorus should be added for the crop to attain an economical growth or yield increase.

A combination of *correlation* and *calibration* research is required to gather information to answer these questions. A vast amount of laboratory, greenhouse and field work on each soil series for each crop in question is required to obtain this information.

Correlation is a relationship between the amount of nutrient extracted (index) from a specific soil by a specific laboratory test (method) and nutrient uptake by plants in the greenhouse or field and crop yield or both. If such a relationship cannot be established, the chemical procedure has (little)

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CROPWATCH

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Lisa Brown Jasa, Editor

For more information about a particular subject, write the authors at the addresses below:

UNL Department of Entomology
202 Plant Industry Bldg.
Lincoln, NE 68583-0816

UNL Department of Plant Pathology
406 Plant Science Bldg.
Lincoln, NE 68583-0722

UNL Department of Agronomy
279 Plant Science Bldg.
Lincoln, NE 68583-0915

UNL Department of Agricultural Meteorology
236 L.W. Chase Hall
Lincoln, NE 68583-0728

Corn rootworm insecticides evaluated

The following data are from corn rootworm insecticide performance studies conducted in 1994 by Lance Meinke, associate professor of entomology, at UNL's Agricultural Research and Development Center near Mead. Consider this information only in the context of these experiments.

The experimental design was a randomized complete block with four replications. Root ratings were based on a 1-6 rating scale, with 1 being no damage and 6 meaning three or more root nodes were destroyed. Treatments which resulted in root ratings of 3 or less would be expected to provide commercially acceptable levels of root protection against corn rootworms.

Experiment 1 was planted on May 4 and Experiment 2 on May 3. Means in each column followed by the same letter are not statistically different (p = 0.05). These experiments included some insecticides and application rates which are not registered and not legal for general use. Follow all pesticide label directions and apply only federally registered pesticides.

S.D. Danielson
Extension Entomology Specialist

Table 1. 1994 corn rootworm soil insecticide Experiment 1. Mead, NE
Root damage evaluation

Insecticide	*Rate oz AI/1000'*	*Placement*	*Mean Root Damage Rating (1-6 scale)**
Counter 20CR	1.2	I	1.73 a
Force 1.5G	0.12	TB	1.93 ab
Counter 15G	1.2	I	2.00 ab
Counter 15G	1.2	TB	2.00 ab
Dyfonate II 15G	1.2	C	2.00 ab
Lorsban 15G (NAF-1)	1.2	TB	2.07 a-c
Force 3.0G	0.12	TB	2.07 a-c
Aztec 2.1G	0.141	I	2.07 a-c
Aztec 2.1G	0.141	TB	2.07 a-c
Fortress 2.5G	0.15	TB	2.07 a-c
Fortress 2.5G	0.15	I	2.13 a-d
Fortress 2.5G	0.30	I	2.13 a-d
Thimet 20G	1.2	B	2.20 a-e
Fortress 2.5G	0.30	TB	2.20 a-e
Force 3.0G	0.12	I	2.20 a-e
Dyfonate II 15G	1.2	TB	2.27 b-e
Counter 20CR	1.2	TB	2.27 b-e
Force 1.5G	0.12	I	2.27 b-e
Lorsban 15G (NAF-1)	1.2	I	2.33 b-e
Fortress 2.5G	0.075	TB	2.87 f
Untreated			3.60 g
Untreated			4.07 g

I = placement directly into open seed furrow
B = 7-inch band over the closed seed furrow in front of the press wheel
TB = T-band, 7-inch band placed over the open seed furrow
C = applied in a band over the row on 10 June 1994 and cultivated into the soil
* = Means in each column followed by the same letter are not significantly different.

Table 2. 1994 corn rootworm soil insecticide Experiment 2. Mead, NE
Root damage evaluation

Insecticide	*Rate*	*Placement*	*Mean Root Damage (1-6 scale)*
Lorsban 15G (NAF-1)	1.2 oz AI/1000'	TB	2.25 a
Furadan 4F	1 lb AI/acre	BR1	2.45 a
Force 1.5G	0.12 oz AI/1000'	TB	2.50 a
Furadan 4F	1 lb AI/acre	BR2	2.50 a
Dyfonate II 15G	1.2 oz AI/1000'	TB	2.65 ab
Counter 15G	1.2 oz AI/1000'	TB	2.70 ab
Furadan 4F	0.9 oz AI/1000'	BD	2.70 ab
Furadan 15G	1.2 oz AI/1000'	TB	3.40 b
Untreated			4.55 c

TB = T-band, 7-inch band placed over the open seed furrow.
BR1 = Broadcast application on 4 June 1994, volume = 20.8 gallons per acre, 30 lb psi, Teejet 8004 nozzle tips.
BR2 = Broadcast application on 13 June 1994, volume = 20.8 gallons per acre, 30 lb psi, Teejet 8004 nozzle tips.
BD = Spray directed to base of corn plants on 4 June 1994, volume = 11 fluid oz per 35', 30 lb psi, Teejet 8001 nozzle tips.
* = Means in each column followed by the same letter are not significantly different.

Dates set for commercial pesticide applicator certification and recertification training & testing

Commercial pesticide applicator certification and recertification training will be conducted at a number of meetings in January and February across the state. A $10 fee will be charged by the Nebraska Department of Agriculture for commercial certification.

Recertification

Below is a schedule of recertification training meetings. Preregistration is not required. Registration will be held from 8:30 a.m. to 9 a.m. Recertification training also will be held at Crop Protection Clinics Jan. 4-24 (see story, page for specific dates.) Training categories are: ag plant, right of way, aquatics, regulatory, seed treatment, demonstration and research.

Following is a schedule of recertification training meetings:

Lincoln at the Nebraska Center, 33rd and Holdrege streets, Jan. 31. Categories: ag animal, forestry, ornamental and turf, right of way, structural, public health, food processing, grain handling and grain fumigation, and wood preservatives.

Norfolk at the Ramada Inn, Hwys 275 and 81 on Feb. 1. Categories: forestry, ornamental and turf, right of way, structural, public health, and food processing, grain handling and grain fumigation.

Omaha at the Douglas County Extension Office, 8015 West Center Road on Feb. 2. Categories: right of way, structural, public health, and food processing, grain handling and grain fumigation.

Omaha at the Douglas County Extension Office, 8015 West Center Road on Feb. 3. Categories: forestry and ornamental and turf.

Scottsbluff at the UNL Panhandle Research and Extension Center, 4502 Avenue I on Feb. 7. Categories: forestry, ornamental and turf, right of way, structural, public health, and food processing, grain handling and grain fumigation.

North Platte at the Stockman Inn, I-80 and Hwy 83 on Feb. 9. Categories: ag animal, forestry, ornamental and turf, right of way, structural, public health, food processing, grain handling and grain fumigation, and wood preservatives.

Grand Island at the Hall County Extension at College Park, 3180 W. Hwy 34 on Feb. 16. Categories: forestry, ornamental and turf, right of way, structural, public health, food processing, grain handling and grain fumigation, and wood preservatives.

Initial certification

Certification is based on satisfactory test scores on a General Standards exam plus one or more categories. Individuals can be trained in General Standards and one category at a training/testing session. Individuals also may take additional category exams without training at a given session. Additional testing dates and locations are arranged by Nebraska Department of Agriculture.

8:15 - 8:30 a.m. Check-in

8:30 a.m. - 12:00 p.m. General Standards training and testing

1:00 p.m. - 4:00 p.m.Category training and testing

Preregistration is required if you want to buy study materials. Each category pack costs $5 (General Standards material included). For registration materials or study pack order forms, contact your local county Extension office or the Extension Pesticide Coordinator, 101 Natural Resources Hall, University of Nebraska, Lincoln, NE 68583-0818, phone (402) 472-1632.

Scottsbluff at the UNL Panhandle Research and Extension Center, 4502 Avenue I on Feb. 8. Categories: ag plant, ornamental and turf, right of way, structural, and fumigation.

Feb. 10 - **North Platte** at the Stockman Inn, 1-80 and Hwy 83. Categories: ag plant, ag animal, forestry, ornamental and turf, aquatics, seed treatment, right of way, structural, public health, wood preservation, fumigation.

Feb. 17 - **Grand Island** at the Hall County Extension Office at College Park, 3180 W. Hwy 34. Categories: ag plant, ornamental and turf, aquatics, right of way, structural, and fumigation.

Norfolk at the Ramada Inn, Hwys 275 and 81 on Feb. 21. Categories: ag plant, ornamental and turf, right of way, structural, fumigation.

Lincoln at the Nebraska Center, 33rd and Holdrege streets on Feb. 22. Categories: ag plant, ag animal, forestry, ornamental and turf, seed treatment, right of way, structural, public health, wood preservation, and fumigation.

Omaha at the Douglas County Extension Office, 8015 West Center Road on Feb. 23. Categories: ag plant, forestry, right of way, structural, public health, wood preservation, and fumigation.

Omaha at the Douglas County Extension Office, 8015 West Center Road on Feb. 24 and March 3. Categories: 04 ornamental and turf.

Larry Schulze
Extension Pesticide Coordinator

Winter Extension meetings offer opportunities

1995 Crop Protection Clinics

The schedule has been set for the 1995 Crop Protection Clinics. The program content will be site specific and tailored to the issues of the area. Commercial Applicator Recertification will be conducted at each site. Detailed programs will be available Dec 1.

A $17 fee will be charged to cover meals and proceedings. Certification costs $10.

Date	*Location*	*Site*
Jan. 4	Lincoln	Lancaster County Extension Office
Jan. 5	Fremont	Holiday Lodge
Jan. 6	Norfolk	Ramada Inn
Jan. 10	Ogallala	Holiday Inn
Jan. 11	Scottsbluff	Panhandle REC
Jan. 12	Cozad	Elks Lodge
Jan. 13	Holdrege	Ag Center
Jan. 17	York	Chances "R"
Jan. 18	Hastings	Holiday Inn
Jan. 19	O'Neil	Legion Club
Jan. 20	Fairbury	4-H Building
Jan. 24	Auburn	Arbor Manor

For more information, contact: Alex Martin, 362 Plant Science, P.O. Box 830915, University of Nebraska-Lincoln, Lincoln, NE. 68583-0915 or call (402) 472-1527.

Agronomy Highlights

Individuals interestsed in learning abut the most recent research from the Department of Agronomy should attend the annual Agronomy Highlights Conference to be held Dec. 20 in Lincoln. The program will include lectures, a symposium, posters, and demonstrations. The mini symposium will feature the most recent crop variety improvements.

The program will be from 8:30 a.m. to 4:30 p.m. at the Cornhusker Hotel in Lincoln There is no fee for the event but individuals should pre-register before Dec. 10. The noon meal is free.

To pre-register or obtain specific program topics, contact: JoAnn Collins, 279 Plant Science Hall, UNL, Lincoln, NE. 68583-0915 or call (402) 472-2811.

Ecofarming Conference

The schedule of Ecofarming Conferences is:

Date	*Location*	*Site*
Jan. 16	Arnold	Legion Club
Jan. 17	McCook	Elks Lodge
Jan. 18	Orleans	Ag Center
Jan. 19	Ogallala	Keith County Exhibit Hall

For further information regarding topics and times, contact Bob Klein, UNL West Central Center, North Platte, NE. 69101 or call (308) 532-3611

Forage Seminars

The following itinerary has been set for a series of Forage and Grassland Management Seminars to be held throughout the coming months. For more information, contact Bruce Anderson, Extension Forage Specialist, 353 Keim Hall, University of Nebraska-Lincoln, Lincoln, Nebraska 68583-0910 or call (402) 472-6237.

Alfalfa Days to be held in Dawson, Keith, and Brown counties Jan. 4-6.

Intensive Grazing Clinics to be held Jan. 9-13, locations to be announced.

Nebraska Forage and Grassland Conference to be held Jan. 19 at the Lancaster County Extension Office.

Converting CRP to Pasture and Hay to be held March 6-10, locations to be announced later.

Nebraska Corn Expo

The Nebraska Corn Expo will be held Feb. 7-8 at the Buffalo County Exhibit Hall in Kearney to highlight the latest technology and developments in the production of irrigated corn.

Topics include government and corn production, production and technology, selection of hybrids and protection programs, fertility and water management, and management economics. Numerous demonstrations, booths and displays will also be featured.

For more information, contact Bob Klein, UNL West Central Center, North Platte, NE. 69101 or call (308) 532-3611.

West Central season in review (Continued from page 155)

for an early harvest. Yields of most irrigated crops were excellent. Dryland crops in many areas in the district were excellent but some areas did not receive timely rain and hence yields were lower. Considerable lodging of sorghum occurred. In addition to the high winds many areas had extensive hail damage.

Fall application of herbicides to winter wheat stubble resulted in both good and bad results. If herbicides were not applied until mid-August or later many weeds had matured, produced seed, and used a lot of moisture. Results from using split herbicide applications with the first treatment applied soon after harvest were excellent.

The West Central Extension District stretches from Dundy County to Furnas County across the southern border and from Keya Paha to Cherry County on the northern border, with North Platte the site of the District Research and Extension Center.

This fall much of the winter wheat in the district was planted into dry seed beds. Most stands look good, but there exceptions exist where the wheat was planted deep and the soils silted over or crusted. Downy brome is a problem in some fields especially in continuous wheat. Winter annual weeds probably will be a problem in many areas in 1995 because the lack of timely rains before planting delayed emergence of weeds which are normally killed during seedbed preparation.

Robert N. Klein
Extension Cropping Systems Specialist, North Platte

Soil tests (Continued from page 155)

value. For example, in Nebraska no yield or growth response to copper and manganese have been observed regardless of crop or soil series. Thus testing soil for these nutrients in Nebraska has little meaning. For example, data from Colorado or Michigan (response to some crops on certain soils has been observed) may be used if producers want an analysis and recommendation for copper or manganese. Further, the index value may not be the same for all crops. For example, the Bray and Kurtz No 1 phosphorus index value of 15 will be sufficient for an economic yield of corn and soybeans but not for wheat.

Calibration is a means of establishing a relationship between a given soil test "index" value and yield response from a specific crop to an addition of a known quantity of the nutrient (in question) to the soil. As indicated in the definition above, numerous field experiments are required for different crops grown on soils with varying nutrient index values. Calibration research needs to be continually updated in terms of new varieties and hybrids and changing cropping systems such as reduced tillage and different cropping rotations.

Soil fertility recommendation

The primary purpose for testing a soil is to use the chemical analysis values to determine if the soil can supply a particular nutrient to a specific crop and if not, how much of the specific nutrient must be added. Fertilizer recommendations based on extensive field research for specific crops on specific soil types have a high probability of being economically and environmentally sound.

The method used to develop the soil test "index" value for several nutrients must be known. For example, two methods for determining the phosphorus index values have been thoroughly researched for most midwest soils. Bray and Kurtz No. 1 method is used for soils without free lime while the sodium-bicarbonate (Olsen) method is used for soils containing free lime. An index value of 8 for Bray and Kurtz No. 1 would result in a phosphorus recommendation for corn while an index value of 8 by the Olsen method would not.

Ken Frank, Agronomist

Jointed Goatgrass Conference

Winter wheat producers interested in crop rotation and other means of controlling jointed goatgrass should attend the Central Great Plains Jointed Goatgrass Conference.

Weed scientists from the University of Nebraska, Kansas State University, Colorado State University, University of Wyoming, and the USDA-ARS will discuss the origins, biology, and control of jointed goatgrass in winter wheat. The Conference is scheduled for Colby, KS at the Ramada Inn on Feb. 21; Ogallala at the Holiday Inn on Feb. 22; and Sterling, CO at the Ramada Inn on Feb. 23. Contact your local county Extension educator or Drew Lyon at 308-632-1266 for more information.

Drew Lyon, Extension Cropping Systems Specialist

Soil moisture projections: Evaluate individual site when estimating for spring

Crop Watch has featured soil moisture projections for the beginning of the 1995 growing season periodically over the last two months. Concerns have been raised about the accuracy of these measurements. Because rainfall, planting dates, crop type, and hybrid choice tends to be highly variable across the state, readers will notice a significant change in the soil recharge estimate table.

Projections for soil moisture included in this issue have been expanded to 11 stations to reduce the distance between sites. *Table 2* lists the probability of recharge given precipitation at the 25%, 50%, and 75% level current soil moisture at 10%, 30%, 50%, and 70% of field capacity for a six-foot profile. *Table 1* projections are based upon an infiltration rate of 70% of *Table 2* precipitation probabilities. Therefore, it becomes incumbent on the producer to estimate current moisture status before gauging potential recharge.

A quick look at *Table 2* indicates that soils which are at 50% of field capacity on Oct. 24 will attain at least 65% of field capacity by April 1, 1995 at each of the three probability levels. If soil moisture levels are above 70% of field capacity entering the growing season, the potential exists for average to above average yields for dryland crops. However, these levels don't guarantee good yields. Conversely, if soil moisture levels are under 50% of field capacity at planting time, dryland crops will be highly dependent on timely rains to insure average yields. Rainfall will need to be much above normal to insure above average yields.

Table 1. Expected precipitation for 10/24/94 - 3/31/95 at the following probability levels.

Location	75%	50%	25%
Falls City	8.00	5.60	4.17
Grand Island	5.85	4.40	3.11
Lincoln	7.15	5.65	4.20
McCook	4.93	3.66	2.73
Norfolk	7.57	5.52	4.34
North Platte	4.50	3.74	2.81
Omaha	7.57	6.09	4.30
Ord	5.30	4.11	3.31
Red Cloud	5.92	3.90	3.00
Scottsbluff	3.25	2.40	1.58
Sidney	4.17	3.25	2.50
Valentine	4.60	3.62	2.97

Plentiful rains over the last two weeks helped alleviate wheat emergence concerns across western Nebraska. It is very likely that the Panhandle district will experience one of the ten wettest October's on record. This rainfall should insure good stand emergence in most locations, along with providing the crop limited subsoil moisture reserves for early spring growth. The crop will need additional moisture this fall and early next spring to reduce the potential for below average yields.

Al Dutcher
State Climatologist
Agricultural Meteorology

Oct. 24 freeze ends season

The 1994 growing season ended Oct. 24-25 as temperatures plunged to the low to mid 20s across the state. Fortunately, grain crops have been safe from frost for several weeks. Gardeners will generally be the only growers affected by this freeze. After two consecutive years of earlier than normal killing freezes, this years freeze was later than normal by about 7-10 days.

Table 2.

	Available Soil Moisture at Field Capacity		Available Soil Moisture at % of Field Capacity		Projected Soil Moisture on 4/1/95 Given the following 10/24 - 3/31 Precipitation Probability Levels. 75%		50%		25%	
Location	*in*	*%*	*in*	*%*	*in*	*%*	*in*	*%*	*in*	*%*
Falls City	12.0	100	1.2	10	6.7	56	5.1	42	4.1	34
			3.7	30	9.1	76	7.5	62	6.5	54
			6.2	50	11.5	96	9.9	82	8.9	74
			8.7	70	12.0	100	12.0	100	11.3	94
Grand Island	12.0	100	1.2	10	5.3	44	4.3	36	3.4	28
			3.6	30	7.7	64	6.7	56	5.8	48
			6.0	50	10.1	84	9.1	76	8.2	68
			8.4	70	12.0	100	11.5	96	10.6	88
Lincoln	12.5	100	1.2	10	6.2	50	5.2	42	3.1	25
			3.7	30	8.7	70	7.7	62	5.6	45
			6.2	50	11.2	90	10.2	82	8.1	65
			8.7	70	12.5	100	12.5	100	10.6	85
McCook	12.0	100	1.2	10	4.6	38	3.8	32	3.1	26
			3.6	30	7.0	58	6.2	52	5.5	46
			6.0	50	9.4	78	8.6	72	7.9	66
			8.4	70	11.8	98	11.0	92	10.3	86
Norfolk	14.5	100	1.4	10	6.6	46	5.3	37	4.4	30
			4.3	30	9.5	66	8.2	57	7.3	50
			7.2	50	12.4	86	11.1	77	10.2	70
			10.1	70	14.5	100	14.0	97	13.1	90
North Platte	12.0	100	1.2	10	4.3	36	3.8	32	3.2	27
			3.6	30	6.7	56	6.2	52	5.6	47
			6.0	50	9.1	76	8.6	72	8.0	67
			8.4	70	11.5	96	11.0	92	10.4	87
Omaha	12.5	100	1.2	10	6.5	52	5.4	43	4.2	34
			3.7	30	9.0	72	7.9	63	6.7	54
			6.2	50	11.5	92	10.4	83	9.2	74
			8.7	70	12.5	100	12.5	100	11.7	94
Ord	10.0	100	1.0	10	4.7	47	3.9	39	3.3	33
			3.0	30	6.7	67	5.9	59	5.3	53
			5.0	50	8.7	87	7.9	79	7.3	73
			7.0	70	10.0	100	9.9	99	9.3	93
Red Cloud	12.0	100	1.2	10	5.3	44	3.9	32	3.3	27
			3.6	30	7.7	64	6.3	52	5.7	47
			6.0	50	10.1	84	8.7	72	8.1	67
			8.4	70	12.0	100	11.1	92	10.5	87
Scottsbluff	11.0	100	1.1	10	3.4	31	2.8	25	2.2	20
			3.3	30	5.6	51	5.0	45	4.4	40
			5.5	50	7.8	71	7.2	65	6.6	60
			7.7	70	10.0	91	9.4	85	8.8	80
Sidney	11.0	100	1.1	10	4.0	36	3.4	31	2.8	25
			3.3	30	6.2	56	5.6	51	5.0	45
			5.5	50	8.4	76	7.8	71	7.2	65
			7.7	70	10.6	96	10.0	91	9.4	85
Valentine	7.0	100	0.7	10	3.9	56	3.2	46	2.8	40
			2.1	30	5.3	76	4.6	66	4.2	60
			3.5	50	6.7	96	6.0	86	5.6	80
			4.9	70	7.0	100	7.0	100	7.0	100